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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,955	12/27/2001	Hachiro Fujita	1163-0378P	5978
2292	7590	04/10/2006	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			TORRES, JOSEPH D	
			ART UNIT	PAPER NUMBER
			2133	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/018,955

Applicant(s)

FUJITA ET AL.

Examiner

Joseph D. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 4-6, 12-18 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-11, 19-24 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I (claims 1-3, 7-11, 19-24 and 26) in the reply filed on 07/16/2004 is acknowledged.

Claims 4-6, 12-18 and 25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07/16/2004.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention:

2. Claims 10 and 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 10 recites, "a normal basis to represent the subfield". In mathematics, a normal basis refers to a basis  $\mathbf{e}_1, \mathbf{e}_2, \dots, \mathbf{e}_k$  whereby  $\|\mathbf{e}_i\|=1$  for  $i$  in  $\{1, 2, \dots, k\}$ . There is

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no mention of any topology or metric in the Applicant's specification nor is a Galois field generally fitted with any metric.

The Examiner assumes the Applicant intended that the basis is generated from roots of a normalized polynomial.

Claim 22 recites similar language as in claim 10.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 10, 11, 22 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 recites, "a normal basis to represent the subfield". In mathematics, a normal basis refers to a basis  $e_1, e_2, \dots, e_k$  whereby  $\|e_i\|=1$  for  $i$  in  $\{1, 2, \dots, k\}$ . There is no mention of any topology or metric in the Applicant's specification nor is a Galois field generally fitted with any metric.

The Examiner assumes the Applicant intended that the basis is generated from roots of a normalized polynomial.

Claim 22 recites similar language as in claim 10.

Claim 11 recites, "a dual basis to represent the subfield". In mathematics, the dual basis of a subspace/subfield is a basis for the orthogonal subspace/subfield of the subspace/subfield and if the dual basis is known,

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then the basis for the subspace/subfield can easily be calculated. However, the dual basis is still a representation for the orthogonal subspace/subfield of the subspace/subfield and not the subspace/subfield itself.

Claim 23 recites similar language as in claim 11.

### ***Specification***

4. The disclosure is objected to because of the following informalities: Claim 10 recites, "a normal basis to represent the subfield". In mathematics, a normal basis refers to a basis  $e_1, e_2, \dots, e_k$  whereby  $\|e_i\|=1$  for  $i$  in  $\{1, 2, \dots, k\}$ . There is no mention of any topology or metric in the Applicant's specification nor is a Galois field generally fitted with any metric.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 7-11, 19-24 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Flagg; Howard Lang (US 4099160 A).

35 U.S.C. 102(b) rejection of claims 1, 7, 19, 24 and 26.

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Flagg teaches a first step of calculating syndromes from a received word and estimating the number of bits in error from the syndromes (see Error Detector and Syndrome Generator 14 in Figure 1 of Flagg; also see Equations 3, 4 and 7 in columns 3 and 4 and note that the number of errors are determined from the error polynomial); a second step of generating a cubic error location polynomial from the syndromes, when it is determined that there is a two-bit error or a three-bit error (Equation 34 in column 8 of Flagg); a third step of determining a normalized cubic equation from the cubic error location polynomial (Equation 35 in column 8 of Flagg), calculating roots of the normalized cubic equation, and calculating roots of the cubic error location polynomial from the roots of the normalized cubic equation (col. 9, lines 30-55 in Flagg; Note: Z is used to calculate the roots of both Equations 34 and 35 in col. 8 of Flagg using Equation 36 and the fact that  $X = X_1 + \lambda$ ); and a fourth step of identifying an error location from the roots of the cubic error location polynomial and correcting a value of information bit of the error location (col. 11, lines 14-19 in Flagg).

35 U.S.C. 102(b) rejection of claim 2.

Flagg teaches translating the error location polynomial over a Galois field into a polynomial over a subfield, calculating a cubic root in the subfield (the roots of Equations 40 and 41 in col. 9 of Flagg exist in a translated subfield of the field extension generated from the roots Equation 38), and calculating a cubic root in the Galois field from the cubic root in the subfield, so as to calculate the roots of the normalized cubic equation (col. 9, lines 30-55 in Flagg).

35 U.S.C. 102(b) rejection of claim 3.

Flagg teaches substituting a root of the error location polynomial for a Galois field element and determining the Galois field element corresponding to the error location by cyclic steps of comparison as the Galois field element is multiplied by a predetermined coefficient at each step (col. 3, lines 18-20 in Flagg teach that the Algorithm in Flagg is for a non-binary BCH code; one of ordinary skill in the art at the time the invention was made would have know that calculation of the magnitudes of errors is derived by substituting the roots of the error locator polynomial  $\lambda(x)$  into the error magnitude polynomial  $\Omega(x)$  since  $\Omega(x) = [1 + S(x)] \lambda(x)$  where  $S(x)$  is the syndrome polynomial: Note: in a cyclic error correction code such as a BCH code,  $x$  is modeled as a shift so that  $x^n$  corresponds to  $n$  shifts).

35 U.S.C. 102(b) rejection of claims 8 and 20.

The values  $x^n$  are an exponential representation. The values  $\alpha^i$  where  $\alpha$  is a root generates an extension field represented by  $G[\alpha, \alpha^2, \dots, \alpha^k]$ .

35 U.S.C. 102(b) rejection of claims 9 and 21.

The values  $x^n$  are an exponential representation. The values  $\alpha^i$  where  $\alpha$  is a root generates an extension field represented by  $G[\alpha, \alpha^2, \dots, \alpha^k]$ . Any element  $t$  in  $G[\alpha, \alpha^2, \dots, \alpha^k]$  can be represented as a linear combination of the linearly independent elements  $\alpha$ ,

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$\alpha^2, \dots, \alpha^k$ ; hence any element in  $t$  is a vector since  $G[\alpha, \alpha^2, \dots, \alpha^k]$  is also a vector space over  $\alpha, \alpha^2, \dots, \alpha^k$ .

35 U.S.C. 102(b) rejection of claims 10 and 22.

Equation 35 in column 8 of Flagg is a normalized polynomial.

35 U.S.C. 102(b) rejection of claims 11 and 23.

In mathematics, the dual basis of a subspace/subfield is a basis for the orthogonal subspace/subfield of the subspace/subfield and if the dual basis is known, then the basis for the subspace/subfield can easily be calculated. However, the dual basis is still a representation for the orthogonal subspace/subfield of the subspace/subfield and not the subspace/subfield itself.

### **Conclusion**

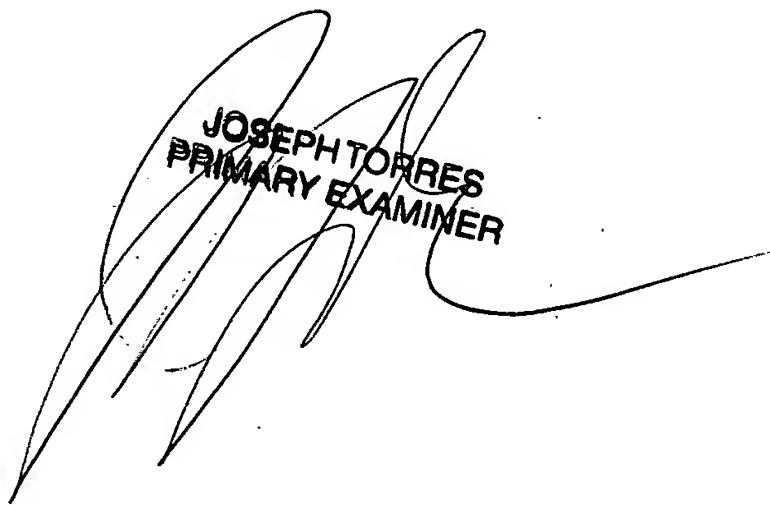
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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